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FURTHER COMMENTS ON MELIPONA

BY HERBERT F. SCHWARZ

The present paper may be regarded as a brief supplement to the monograph on the genus *Melipona* (Schwarz, Aug. 16, 1932, Bulletin of the American Museum of Natural History, LXIII, Art. 4, pp. 231-460, Pls. I-X). It is based on specimens that have come under observation subsequent to the writing of that monograph.

Melipona fasciata subspecies **paraënsis**, variety **guerreroënsis**, new variety

♀. Differs from typical *paraënsis* in the coloration of the abdominal tergites, which, instead of being black or at least deep reddish brown verging on black, are sometimes wholly castaneous or black only on the more apically located tergites. Abdominal bands feeble, sometimes lacking. Bands bordering the sides of the mesonotum lacking.

Legs dark as in typical *paraënsis*. Maculations other than those noted and color of hairs the same as in typical *paraënsis*.

♂. Differs from typical *paraënsis* in respect to the same characters noted for the worker.

Clypeus with a narrow longitudinal stripe down its middle and an angular stripe of irregular thickness that zigzags around the apex and adjacent slanting sides of the clypeus.

In describing *Melipona fasciata melanopleura* Professor Cockerell, 1919, expressed the opinion that *melanopleura* "is possibly no more than a dimorphic variation of *costaricensis*." Later (1932) I discussed the instability of the abdominal coloration of *melanopleura*, indicating that in some of the specimens the basal tergites were light brown, the apical ones black,—a condi-

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tion intermediate between the more uniformly maculated extremes represented by the dark *costaricensis* or typical *fasciata* on the one hand and *melanopleura* of brownish abdomen on the other. Similarly, in the paper of 1932, I pointed out a parallel series of transitions between *Melipona fasciata lateralis* and its color variant *kangarumensis*.

More or less the same degree of intergradation between the pure black and distinctly banded abdomen of *paraënsis* at the one extreme and the castaneous and indistinctly banded abdomen of *paraënsis guerreroënsis* at the other occurs among the Mexican specimens that I have assigned to the latter variety. In these intergrading specimens it is invariably the apical tergites of the abdomen that are dark and at least the two basal tergites that are wholly or largely castaneous. None of these Mexican specimens attains the uniformly black condition of the dorsal side of the abdomen which, except for the basal concavity and the bands, is characteristic of typical *paraënsis*, while in many of them the tergites are wholly castaneous.

The specimens on which the present variety is based include a number of workers from localities in the state of Guerrero—Tierra Colorada, 2000 ft., Rincon, 2800 ft., Tepetlapa, 3000 ft., Amula, 6000 ft., Xucumanatlan, 7000 ft., Omilteme, 8000 ft. There is also a male from Chilpancingo, 4600 ft., in the same state, collected in October, and one from Omilteme. All of the Guerrero specimens were obtained by H. H. Smith and were kindly lent by the British Museum. To the British Museum I am indebted also for a worker from Oaxaca and two specimens from Orizaba,—one of them a male, Dec. 1887, from the Godman-Salvin collection. The specimens lent by the British Museum have been supplemented by six specimens, all workers, collected by H. E. Hinton and R. L. Usinger at Real de Arriba, District of Temascaltepec, 6370 ft., in the southwestern corner of the State of Mexico, about 100 miles southwest of the City of Mexico. In all of the bees from the last-mentioned locality the abdomen is pure castaneous without admixture of black. Dr. Usinger, to whom I am indebted for the opportunity of examining the specimens from Real de Arriba, writes that they were domesticated and that the nest was in “an upright log, with a small box for a ‘super.’”

Type material in the British Museum, California Academy of Sciences, and American Museum.

Melipona fasciata melanopleura* and *M. f. belizeæ

In 1932 I described as a subspecies of *M. fasciata* an insect from British Honduras which I name *belizeæ*. I assigned to it subspecific rank on the basis of the fulvous hairs of its thorax and vertex, its yellow scutellum and axillæ, and other characters. In these respects it differs from its close relative in Costa Rica, *melanopleura*, which has black hairs on vertex, mesonotum, upper two-thirds of mesopleura, scutellum, and axillæ, and which has the chitin of the scutellum and axillæ black or dark reddish.

Since the paper in question was published I have had opportunity to examine specimens, kindly loaned by the British Museum, from Teapa, State of Tabasco, Mexico, collected in February by H. H. Smith, and from several localities in Guatemala—Senahu and Chacoj in Vera Paz and Mirandilla—collected by Champion.

The specimens from the State of Tabasco align themselves with *belizeæ* but the specimens from Guatemala are rather intermediate between *melanopleura* and *belizeæ*. Those from Senahu and Mirandilla have the yellowish scutellum and axillæ of *belizeæ*, but the hairs of the vertex and mesonotum, while not wholly black, are often predominantly of that color as are those of the upper part of the mesopleura, approximating in these respects *melanopleura*. Guatemala would seem to be the meeting ground of the fulvous haired *belizeæ* from the north and the dark-haired *melanopleura* from the south, with a resulting instability of coloration.

***Melipona schencki* subsp. *picadensis* (Strand)**

♀ (Gravid). Head somewhat smaller than that of the worker and with finer sculpturing and greater resulting shininess. The hairless clypeus especially shiny, with sparse, irregular punctation over most of its surface, but finely tessellate or punctate-tessellate here and there along its basal, apical, and lateral margins. Front finely and rather densely tessellate; the vertex with ultra-fine tessellation, semishiny. The malar space much longer than in the worker, the shortest distance between the rim of the eye and the base of the mandible being about one-third of the width of the mandible at the base. The mandible more arcuate along its outer surface than is the

basally rather straight mandible of the worker. The upper part of the head black; the clypeus castaneous with a rather broad but diffuse and ill-defined, ferruginous maculation bisecting it longitudinally, and two somewhat more clearly outlined, faded yellowish spots, one in each of the lower lateral extremities of the clypeus; the labrum and the mandibles, except for their darkened apical edge and black basal prominences, a faded, whitish yellow; the supraclypeus ferruginous; a castaneous area fills the space between the clypeus and the eye and extends upward attenuated along the inner orbit of the eye about half-way to the summit. The long hairs of the front brownish to blackish; those of the vertex and cheeks black; those fringing the mandibles below and the labrum stramineous.

The thorax much less closely sculptured than is that of the worker, shiny both on the mesonotum and mesopleura due to the fact that the tessellation is finer or has been erased or replaced by small punctures with intervening smooth spaces. The thorax black except for the tawny axillæ and scutellum. The long hairs of the thorax unfortunately more or less matted and discolored due to moisture and their original color, therefore, somewhat difficult to interpret. On the mesonotum they appear dark, possibly approaching the black condition of those of the worker, but on the mesopleura and especially on the scutellum the hair appears tawny, departing in this respect from the condition of the worker of subspecies *picadensis* and inclining to the condition of the typical subspecies.

The legs blackish, with a ferruginous area at the apex of all the femora. The hair of the legs not so uniformly dark as it is in the worker. There are black hairs on the external surface of all the tibiæ, almost exclusively so on the middle and hind tibiæ, and on the hind femora black hairs predominate. The other joints of the legs with for the most part grayish to yellowish hairs; the metatarsal brushes a little more golden. The hair of the legs rather long and coarse. The hind tibiæ without the lateral fringes characteristic of the worker, not quite so wide as in that cast, with the posterior part of the apex rather rounded instead of definitely angulate.

The wings very short compared with the length and bulk of the body, even shorter than in the worker, hyaline faintly tinted with yellowish, of slightly stronger stain in the basal part. The venation and tegulæ ferruginous.

The abdomen much extended and swollen, deep castaneous to blackish, but with a rather broad, clearly defined, pale yellow, hairless area on tergite 3 separating a basal area of castaneous from an apical area of castaneous. Tergite 1 rather closely tessellated and covered, more densely at the sides than toward the middle, with somewhat woolly, brownish yellow hairs. Tergite 2 seemingly shorter than the subsequent tergites and therefore with its base probably incompletely revealed. The portion of the base that shows on tergite 2 is a smooth, hairless, pale yellowish area like that described for tergite 3; the apex of tergite 2 (perhaps the only part exposed in the virgin queen) is hairless and virtually smooth (with ultra-microscopic transverse ridges) on its upper half and with rather coarse punctation and fringing hairs on its lower half. The basal castaneous region of the fully exposed tergite 3

densely tessellated and closely covered with grayish to brownish feathery tomentum, the median area of yellow hairless, the apical castaneous area punctate and with rather long, yellowish brown hairs. Tergites 4 and 5 similar in their sculpturing and in the color and distribution of their hairs to tergite 3; however, there is no yellowish median area on tergites 4-5 but at most an area of a little paler brown which, contrary to the condition on tergite 3, is punctate and somewhat hairy, constituting a transition rather than a division between the basal and the apical areas. Tergite 6 somewhat less exposed, with the extreme base concealed; like the preceding tergites it has long, yellowish hairs in the apical region.

Length 10 mm. (of which the abdomen occupies 6 mm.); width of thorax $3\frac{1}{4}$ mm.; length of forewing, including tegula, $6\frac{1}{4}$ mm.

♂. The face very much narrower than in the worker or the queen, with the lateral extremities of the clypeus almost in contact with the rim of the eye instead of being far removed from it as in the worker and especially in the queen. The facial maculations far more distinct than in either the worker or the queen. The entire clypeus is pale yellowish except for two faint, subparallel, longitudinal, brownish stripes and brownish suffusion along the apex; the side-facial maculations, extending half-way up along the inner orbit of the eye, broad below, attenuated above, are likewise light yellow; the supra-clypeal area more invaded by brown. The mandibles hour-glass shaped, black, with a ferruginous apex. The hairs of the head long and black, those fringing the mandibles below and those of the vertex especially long, those on clypeus, front, and cheeks only a little shorter, those on the labrum and scape distinctly shorter; in addition to the longish, black hairs there are shorter, grayish, plumose hairs on the front. The clypeus punctate-tessellate; the front densely tessellated, dull; the vertex a little more lightly tessellated, with a faint sheen.

The mesonotum, mesopleura, and propodeum densely tessellated and dull, the scutellum slightly shiny but with a fairly close granular punctation. The scutellum is deep reddish verging on black; the mesonotum and the other areas of the thorax black. The hair of the mesonotum, scutellum, and mesopleura black. An encircling fringe of hairs on the tubercles whitish.

The legs covered almost exclusively with black hairs but the hairs on the under side of the coxæ and trochanters largely pale, and the metatarsal brushes golden. The hind tibiæ considerably narrower than in the worker, their somewhat rounded instead of posteriorly angular apex about as wide as the rather parallel-sided basitarsi.

The wings hyaline, faintly stained with yellow; the venation stigma, and tegulae ferruginous.

The tergites of the abdomen densely hirsute but the hairs not so predominantly black as in a worker from the same locality, whitish hairs largely replacing black on the sides of tergites 1 and 2 and even over the middle of tergites 3 and 4 while tergites 2 and 3 have whitish fringes.

Length 9 mm.; width of thorax 4 mm.; length of forewing, including tegula, $7\frac{1}{2}$ mm.

The above descriptions, based on specimens lent by the British Museum, are given in some detail because this subspecies has been described up to the present only from the worker.

The queen of *schencki picadensis* has not so great a preponderance of dark hairs as have the worker and the male, and in the partial replacement of black hairs by fulvous inclines somewhat to the coloration of the typical subspecies. It is to be noted that the queen of typical *schencki* has light hairs in certain areas where the hairs of the worker are black, so that the queens of both subspecies manifest a somewhat parallel tendency. The queen of *picadensis* has, however, far more dark hair than the queen of typical *schencki*, which has the hair of the head, thorax and abdomen rather uniformly straw-yellow and only on the legs has darker admixture.

The coloration of the hairs of the abdomen is very variable in *schencki picadensis*. The male above described has the abdominal hairs at variance with those of a worker from the same locality and, although this worker probably approximates the coloration noted by Strand in his description, both are in turn rather at variance, in respect to the coloration of the abdominal hairs, with workers I described in 1932.

The queen of *schencki picadensis* here described was collected, together with workers, by R. von Ihering, in Rio Grande do Sul, southern Brazil. The male and a worker were obtained at Theresopolis, presumably the locality in the State of Santa Catharina, southern Brazil.

Melipona schencki subspecies **schencki** (Gribodo)

Among specimens submitted for identification by the British Museum there are workers of the typical subspecies of *schencki* from the following localities:

Guaruja, Ilha Santo Amaro, April 8-13, 1912 (G. E. Bryant);
Paraná (E. Dukinfield Jones).